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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
CHANDRAN, BIJU INDIRA	

ART UNIT	PAPER NUMBER
2835	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/828,767	CHU ET AL.	
	Examiner	Art Unit	
	Biju Chandran	2835	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4/21/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 9 specifies that the first end of the inlet duct as the upper end when the duct is connected to the rack and the second end as the lower end. According to this limitation, the end of the inlet duct attached to the rack is the first end and the end that is connected to the conditioned air inlet is the second end. However, the specification (paragraph 0011) and the language in claims 8 &10 indicate that the end of the inlet duct attached to the rack is the second end and the end that is connected to the conditioned air inlet is the first end. For the purposes of examination, the examiner has assumed that the end of the inlet duct attached to the rack is the second end and the end that is connected to the conditioned air inlet is the first end.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1, 2, 5-11, and 13-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bash et al. (US 2004/0218355 A1).

   - Regarding claim 1, Bash et al. disclose an air flow system for facilitating cooling of rack-mounted electronic equipment, the air flow system comprising: an inlet duct (426a, 426b, 426c) configured to attach to rack-mounted electronic equipment to at least partially cover an air-intake side thereof, and define a supply air flow plenum for directing air from a conditioned air source to the air-intake side of the rack-mounted electronic equipment; and wherein the inlet duct has a primary, conditioned air inlet at a first end for receiving conditioned air (424) from the conditioned air source (408), and is tapered from the first end to a second end thereof with the supply air flow plenum having a varying air flow cross-section, and wherein the inlet duct further comprises an auxiliary room air inlet for providing supplemental room air to the air-intake side of the rack-mounted electronic equipment (paragraph 0030, 0034, '22' on the referenced application US 2004/0217072 A1 by Bash et al.). While Bash et al. discloses that the purpose of the auxiliary input is to vary the airflow through the duct; they do not explicitly disclose its location in the inlet duct. It would have been obvious to one of ordinary skill in the art at the time of the invention, to locate the auxiliary air inlet at any location in inlet duct (even close to the first end), by routine experimentation to determine

its optimal location for efficiency. Bash et al. also do not explicitly state that the auxiliary air inlet facilitates mixing of conditioned air with room air. However, it would have been obvious to one of ordinary skill in the art at the time of the invention that providing an auxiliary air inlet on the inlet duct carrying conditioned air will facilitate mixing of the conditioned air with the room air provided by the auxiliary air inlet.

- Regarding claim 2, Bash et al. further disclose that the auxiliary room air inlet of the inlet duct has an adjustable opening size (paragraph 0030) for controlling an amount of supplemental room air drawn into the supply airflow plenum for mixing with the conditioned air from the conditioned air source.
- Regarding claim 5, Bash et al. further disclose that the inlet duct comprises a first duct of two ducts (426a, 428b), and wherein a second duct (428b) of the two ducts is configured to attach to the rack-mounted electronic equipment to at least partially cover an air-outlet side thereof, and wherein when the first duct (426a) is attached to at least partially cover the air-intake side, the first duct and air-intake side define a supply air flow plenum with a converging air flow cross-section from a lower portion to an upper portion thereof, and wherein when the second duct is attached to at least partially cover the air-outlet side, the second duct and air-outlet side define a return air flow plenum with a diverging air flow cross-section from a lower portion to an upper portion

thereof, the second duct having an exhaust opening (32 in figure 1) in the upper portion thereof.

- Regarding claim 6, Bash et al. further disclose that the first and second ducts are identical structures (paragraph 0034).
- Regarding claim 7, Bash et al. further disclose a reversible attachment mechanism (58) for attaching the identically structured first duct and second duct to the rack- mounted electronic equipment to cover either the air-intake side or the air-outlet side thereof (paragraphs 0034 & 0039).
- Regarding claim 8, Bash et al. further disclose that the inlet duct is attached to the rack-mounted electronic equipment to at least partially cover the air-intake side thereof, the supply air flow plenum defined by the inlet duct and the air-intake side of the rack-mounted electronic equipment has a converging air flow cross-section from the first end of the inlet duct to the second end of the inlet duct (figure 8).
- Regarding claim 9, Bash et al further disclose that the second end of the inlet duct comprises an upper end of the inlet duct when the inlet duct is attached to the rack- mounted electronic equipment to at least partially cover the air-intake side thereof, with the first end of the inlet duct comprising a lower end of the inlet duct (figure 8).
- Regarding claim 10, Bash et al. disclose a combined airflow system and rack-mounted electronic equipment apparatus comprising: a rack

unit comprising a plurality of drawer units each containing an electronic unit, the rack unit being at least partially air cooled and having an air-intake side and an air-outlet side; an inlet duct (426a) attached to the rack unit to at least partially cover the air-intake side thereof, and defining a supply air flow plenum for directing air (424) from a conditioned air source (408) into the air-intake side of the rack unit; and wherein the inlet duct has a primary, conditioned air inlet at a first end for receiving conditioned air from the conditioned air source, and is tapered from the first end to a second end thereof with the supply air flow plenum having a varying air flow cross-section, and wherein the inlet duct further comprises an auxiliary room air inlet for providing supplemental room air to the air-intake side of the rack-mounted electronic equipment (paragraph 0030, 0034, '22' on the referenced application US 2004/0217072 A1 by Bash et al.). While Bash et al. discloses that the purpose of the auxiliary input is to vary the airflow through the duct; they do not explicitly disclose its location in the inlet duct. It would have been obvious to one of ordinary skill in the art at the time of the invention, to locate the auxiliary air inlet at any location in inlet duct (even close to the first end), by routine experimentation to determine its optimal location for efficiency. Bash et al. also do not explicitly state that the auxiliary air inlet facilitates mixing of conditioned air with room air. However, it would have been obvious to one of

ordinary skill in the art at the time of the invention that providing an auxiliary air inlet on the inlet duct carrying conditioned air will facilitate mixing of the conditioned air with the room air provided by the auxiliary air inlet.

- Regarding claim 11, Bash et al. further disclose that the auxiliary room air inlet of the inlet duct has an adjustable opening size (paragraph 0030) for controlling an amount of supplemental room air drawn into the supply airflow plenum for mixing with the conditioned air from the conditioned air source.
- Regarding claim 13, Bash et al. further disclose that the inlet duct comprises a first duct of two ducts (426a, 428b), and wherein a second duct (428b) of the two ducts is configured to attach to the rack-mounted electronic equipment to at least partially cover an air-outlet side thereof, and wherein when the first duct (426a) is attached to at least partially cover the air-intake side, the first duct and air-intake side define a supply air flow plenum with a converging air flow cross-section from a lower portion to an upper portion thereof, and wherein when the second duct is attached to at least partially cover the air-outlet side, the second duct and air-outlet side define a return air flow plenum with a diverging air flow cross-section from a lower portion to an upper portion thereof, the second duct having an exhaust opening (32 in figure 1) in the upper portion thereof.

- Regarding claim 14, Bash et al. further disclose a reversible attachment mechanism (58) for attaching the identically structured first duct and second duct to the rack- mounted electronic equipment to cover either the air-intake side or the air-outlet side thereof (paragraphs 0034 & 0039).
- Regarding claim 15, Bash et al. further discloses that the electronic components 34 housed in the different drawers (figure 1) may contain air-moving devices (paragraph 0032). If each drawer in Bash et al. do not indeed include an air moving device for directing air through the drawer unit from the air-intake side to an air- outlet side of the rack unit, the applicants admitted prior art (figure 1) indicates electronic components with air moving devices (14) in each drawer. It would have been obvious to one of ordinary skill in the art at the time of the invention to cool a prior art rack mounted electronic equipment as disclosed by the applicant in figure 1, with the airflow system disclosed by Bash et al. to increase the cooling efficiency (paragraph 0002-0004).
- Regarding claim 16, Bash et al. further disclose that the supply air flow plenum defined by the inlet duct (426a) and the at least partially covered air-intake side of the rack unit has a converging air flow cross-section from the first end of the inlet duct to the second end of the inlet duct.

- Regarding claim 17, Bash et al. further disclose that the auxiliary room air inlet in the inlet duct is adjacent to the primary, conditioned air inlet in the inlet duct (paragraph 0030, 0034, '22' on the referenced application US 2004/0217072 A1 by Bash et al.). If in fact, the auxiliary room air inlet of Bash et al. is not adjacent to the conditioned air inlet, It would have been obvious to one of ordinary skill in the art at the time of the invention, to locate the auxiliary air inlet at any location in inlet duct (even adjacent to the conditioned air inlet), by routine experimentation to determine its optimal location for efficiency.
- Regarding claim 18, Bash et al. disclose a method for facilitating cooling of rack-mounted electronic equipment, the method comprising: providing a duct configured to attach to rack-mounted electronic equipment to at least partially cover an air-intake side thereof (426a), and define a supply air flow plenum having a varying air flow cross-section for directing air from a conditioned air source (408) into the air-intake side of the rack-mounted electronic equipment, and wherein the providing includes providing a first opening at a first end of the duct for facilitating conditioned air flow from a conditioned air source (408) into the supply air flow plenum for supply to the air-intake side of the rack-mounted electronic equipment, and providing an adjustable second opening (paragraph 0030, 0034, '22' on the referenced application US 2004/0217072 A1 by Bash et al.) in the duct for facilitating

supplemental room air flow into the supply air flow plenum for supply to the air-intake side of the rack-mounted electronic equipment. While Bash et al. discloses that the purpose of the auxiliary input is to vary the airflow through the duct; they do not explicitly disclose its location in the inlet duct. It would have been obvious to one of ordinary skill in the art at the time of the invention, to locate the auxiliary air inlet at any location in inlet duct (even close to the first end), by routine experimentation to determine its optimal location for efficiency. Bash et al. also do not explicitly state that the auxiliary air inlet facilitates mixing of conditioned air with room air. However, it would have been obvious to one of ordinary skill in the art at the time of the invention that providing an auxiliary air inlet on the inlet duct carrying conditioned air will facilitate mixing of the conditioned air with the room air provided by the auxiliary air inlet.

2. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bash et al. in view of Spinazzola et al. (US 6,412,292 B2).

   - Regarding claim 3, Bash et al. discloses all the limitations of claim 2 and further discloses that the primary, conditioned air inlet is at a lower end of the inlet duct (see inlet duct 102 in Figure 5A) when the inlet duct is attached to the rack-mounted electronic equipment to at least partially cover the air-intake side thereof, and wherein the inlet duct is

configured to reside over a conditioned air outlet in air flow communication with the conditioned air source (408). Although Bash et al. states that the conditioned air inlet of the inlet duct receives airflow (106 in figure 5A) from a vent of the data center (420a in figure 8), they do not explicitly disclose that the inlet duct seals the conditioned air outlet. If in fact the inlet duct in Bash et al. do not seal the conditioned air outlet, Spinazzola et al. disclose an air flow system for rack mounted electronic equipment where the inlet duct resides over (see figure 1) and seals the conditioned air outlet (8a). At the time of the invention it would have been obvious to one of ordinary skill in the art to incorporate the inlet duct that forms a seal with the conditioned air outlet as taught by Spinazzola et al. in the air flow system as disclosed by Bash et al. to lower the temperature of the cooling air supplied to the electronic equipment and thereby increase the efficiency of the coiling system (Spinazzola et al., abstract).

- Regarding claim 4, the air flow system disclosed by Bash et al. and modified by Spinazzola et al. disclose all the limitations of claim 3 and further disclose that the conditioned air outlet comprises a perforated flow tile (paragraph 0091, '116' in the referenced application US 2005/0173549 A1 by Bash et al.) in a data center containing the rack mounted electronic equipment (paragraph 0001).

2. Claim 12 rejected under 35 U.S.C. 103(a) as being unpatentable over Bash et al. in view of Steinbrecher (US 2005/0168942 A1). Bash et al. disclose all the limitations of claim 11 except for the auxiliary room air inlet comprising a sliding plate for providing adjustable control of the opening size of the auxiliary room air inlet. At the time of the invention it would have been obvious to one having ordinary skill in the art to chose any known mechanism for providing adjustable control of the auxiliary air inlet to vary the amount of supplemental room air drawn into the airflow plenum, since the applicant has not disclosed that the sliding plate solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with the rotating plate ('24' in referenced application US 2004/0217072 A1 by Bash et al) mechanism disclosed by Bash et al. If in fact, the sliding plate mechanism does solve a particular problem, Steinbrecher discloses a mechanism for providing adjustable control of the opening size of an air inlet that comprises a sliding plate (134). At the time of the invention it would have been obvious to one of ordinary skill in the art to incorporate the sliding plate mechanism to provide adjustable control of the opening size as taught by Steinbrecher in the apparatus disclosed by Bash et al. to provide the ability to close the auxiliary air inlet and thereby provide cooler air to the rack unit in the event of failure of the actuator mechanism that controls the auxiliary air inlet (Steinbrecher, paragraph 0013).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Biju Chandran whose telephone number is (571) 272-5953. The examiner can normally be reached on 8AM - 5PM. Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynn Feild can be reached on (571) 272-2092. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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LYNN FEILD
SUPERVISORY PATENT EXAMINER